WHAT IS CLAIMED IS:

1. A method for constructing a composite image of at least a portion of an object based on a plurality of source images, each of the plurality of source images including at least that portion of the object, each of the plurality of source images corresponding to a different focal plane with respect to the object, the method comprising:

performing a first type of analysis of the source images, at at least some of a plurality of spatial locations in the source images, to determine a first set of pixels of the composite image corresponding to at least one of edges and boundaries in the composite image;

performing a second type of analysis of the source images, at at least some of the plurality of spatial locations in the source images, to determine a second set of pixels of the composite image corresponding to surfaces in the composite image.

2. The method of claim 1, wherein the first set of pixels of the composite image comprises image portions of the composite image corresponding to adequately focused edges or boundaries included in the plurality of source images.

3. The method of claim 1, wherein the second set of pixels of the composite image comprises image portions of the composite image corresponding to adequately focused surface regions included in the plurality of source images.

4. The method of claim 1, wherein:

the first set of pixels of the composite image is determined before the second set of pixels of the composite image is determined; and

the second set of pixels is determined such that the second set of pixels does not include any of the pixels of the composite image which have been determined to be in the first set of pixels.

5. The method of claim 4, wherein determining the second set of pixels of the composite image further comprises suppressing image artifacts which correspond to out-of-focus edges or boundaries included in the plurality of source images.

6. The method of claim 5, wherein suppressing image artifacts which correspond to out-of-focus edges or boundaries included in the plurality of source images comprises:

determining at least one pixel in the second set of pixels of the composite image that lies at least a prescribed setback distance away from each pixel of the first set of pixels of the composite image, and

subsequently determining at least one pixel in the second set of pixels of the composite image that lies at a distance less than the prescribed setback distance away from at least one pixel of the first set of pixels of the composite image, based at least partially on a characteristic associated with at least one of the at least one pixel in the second set of pixels of the composite image that lies at least the prescribed setback distance away from each pixel of the first set of pixels of the composite image.

7. The method of claim 6, wherein:

the at least one pixel in the second set of pixels of the composite image that lies at least the prescribed setback distance away from each pixel of the first set of pixels of the composite image comprises a seed pixel;

the subsequently determined at least one pixel in the second set of pixels that lies at a distance less than the prescribed setback distance away from at least one pixel of the first set of pixels of the composite image is determined based on a grown region including the seed pixel, and

the at least one characteristic associated with the at least one of the at least one pixel in the second set of pixels of the composite image that lies at least the prescribed setback distance away from each of the pixel of the first set of pixels of the composite image comprises at least one of a source image, a source image index, and a source image focal plane.

8. The method of claim 1, wherein at least one of the first type of analysis and the second type of analysis is based on at least one of grayscale image intensities and color image intensities.

9. The method of claim 8, wherein the first type of analysis comprises a numerical characterization of the source images at the at least some of the plurality of spatial locations.

10. The method of claim 9, wherein the numerical characterization comprises at least one of a gradient analysis, a gradient derivative analysis, spatial filtering, and Gaussian spatial filtering.

11. The method of claim 9, wherein determining the first set of pixels of the composite image comprises:

analyzing the results of the numerical characterization of the source images at the at least some of the plurality of spatial locations to determine spatial locations where the numerical characterization results are satisfactory; and

at each respective spatial location where a numerical characterization result is satisfactory, determining a respective satisfactory source image corresponding to the satisfactory result; and

determining at least one pixel of the first set of pixels of the composite image at the respective spatial locations based at least partially on the respective satisfactory source image.

12. The method of claim 11, wherein determining the at least one pixel of the first set of pixels of the composite image at the respective spatial locations based at least partially on the respective satisfactory source image comprises making the at least one pixel of the first set of pixels of the composite image at the respective spatial location the same as the at least one pixel of the satisfactory source image that is spatially congruent with the at least one pixel of the first set of pixels of the composite image at the respective spatial location.

13. The method of claim 11, wherein determining spatial locations where the numerical characterization results are satisfactory comprises determining spatial locations where the numerical characterization results of any of the source images at that respective spatial location fall within a prescribed range of satisfactory values.

14. The method of claim 8, wherein the second type of analysis comprises a numerical characterization of the source images at the at least some of the plurality of spatial locations.

15. The method of claim 14, wherein the numerical characterization comprises at least one of a texture classification analysis, a contrast classification

analysis, a texture classification analysis including a variance analysis, and a fractal dimension analysis.

16. The method of claim 14, wherein determining the first set of pixels of the composite image comprises:

analyzing the results of the numerical characterization of the source images at the at least some of the plurality of spatial locations to determine spatial locations where the numerical characterization results are satisfactory;

determining, at each respective spatial location where a numerical characterization result is satisfactory, a respective satisfactory source image corresponding to the satisfactory result; and

determining at least one pixel of the second set of pixels of the composite image at the respective spatial locations based at least partially on the respective satisfactory source image.

17. The method of claim 16, wherein determining the at least one pixel of the second set of pixels of the composite image at the respective spatial locations based at least partially on the respective satisfactory source image comprises making the at least one pixel of the second set of pixels of the composite image at the respective spatial location the same as the at least one pixel of the satisfactory source image that is spatially congruent with the at least one pixel of the second set of pixels of the composite image at the respective spatial location.

18. The method of claim 16, wherein determining spatial locations where the numerical characterization results are satisfactory comprises determining spatial locations where the numerical characterization results of any of the source images at that respective spatial location fall within a prescribed range of satisfactory values.

19. The method of claim 16, wherein determining at least one pixel of the second set of pixels of the composite image at the respective spatial locations based at least partially on the respective satisfactory source image comprises determining a source image having a focal plane which is representative of the focal planes of a plurality of respective satisfactory source images corresponding to a plurality of respective spatial locations in a local region including the at least one pixel of the second set of pixels of the composite image, and determining the at least

one pixel of the second set of pixels of the composite image based on the source image having the representative focal plane.

20. A recording medium that stores a control program, the control program executable on a computing device, the computing device couplable to a vision system, the control program including instructions for constructing an adequately focused composite image of at least a portion of an object based on a plurality of source images of at least that portion of the object, the plurality of source images corresponding to a plurality of focal planes with respect to the object, the instructions comprising:

instructions for analyzing the source images at a plurality of spatial locations in the source images with a first analysis technique that is sensitive to focus and at least one boundary property;

instructions for determining a first set of pixels of the composite image based on the results of the first analysis technique;

instructions for analyzing the source images at a plurality of spatial locations in the source images with a second analysis technique that is sensitive to focus and at least one surface property; and

instructions for determining a second set of pixels of the composite image outside of the first set of pixels based on the results of the second analysis technique.

21. A carrier wave encoded to transmit a control program to a device for executing the control program, the device couplable to a vision system, the control program including instructions for constructing an adequately focused composite image of at least a portion of an object based on a plurality of source images of at least that portion of the object, the plurality of source images corresponding to a plurality of focal planes with respect to the object, the instructions comprising:

instructions for analyzing the source images at a plurality of spatial locations in the source images with a first analysis technique that is sensitive to focus and at least one boundary property;

instructions for determining a first set of pixels of the composite image based on the results of the first analysis technique;

instructions for analyzing the source images at a plurality of spatial locations in the source images with a second analysis technique that is sensitive to focus and at least one surface property; and

instructions for determining a second set of pixels of the composite image outside of the first set of pixels based on the results of the second analysis technique.

22. A vision system comprising an imaging system, a vision system controller, a memory portion, and a composite image processor operable to construct an adequately focused composite image of at least a portion of an object based on a plurality of source images of at least that portion of the object, the plurality of source images corresponding to a plurality of focal planes with respect to the object, the composite image processor comprising:

an edge processing portion that performs a first type of analysis of the source images, at at least some of a plurality of spatial locations in the source images, to determine a first set of pixels of the composite image corresponding to at least one of edges and boundaries in the composite image; and

a surface processing portion that performs a second type of analysis of the source images, at at least some of the plurality of spatial locations in the source images, to determine a second set of pixels of the composite image corresponding to surfaces in the composite image.

23. The vision system of claim 22, wherein:

the edge processing portion comprises:

a source image edge processing portion usable to provide a first characterization of the source images at the at least some of the plurality of spatial locations, the first characterization usable to indicate adequately focused edges or boundaries included in the source images, and

a composite image edge determining portion that determines the first set of pixels of the composite image based on the first characterization provided by the source image edge processing portion; and

the surface processing portion comprises:

a source image surface processing portion usable to provide a second characterization of the source images at the at least some of the plurality of

spatial locations, the second characterization usable to indicate adequately focused surface regions included in the source images; and

a composite image surface determining portion for determining the second set of pixels of the composite image based on the second characterization provided by the source image surface processing portion.

24. The vision system of claim 22, wherein;

the edge processing portion determines the first set of pixels of the composite image before the surface processing portion determines the second set of pixels of the composite image; and

the surface processing portion determines the second set of pixels such that the second set of pixels does not include any of the pixels of the composite image which have been determined to be in the first set of pixels.

25. The vision system of claim 22, wherein, when the composite image processor determines the second set of pixels of the composite image, the composite image processor suppresses image artifacts which correspond to out-of-focus edges or boundaries included in the plurality of source images.

26. The vision system of claim 22, wherein the composite image processor is part of a general computerized control system of the vision system.

27. The vision system of claim 26, wherein the general computerized control system further comprising a control instruction generation system operable to generate at least one of a part program instruction, an inspection program control instruction, and a composite image processor control instruction, the generated instruction usable to operate the composite image processor to construct a desired representation of a composite image.